ATOMIC ENERGY newsletter

THE FIRST AND ONLY ATO[illegible]

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Dear Sir:

Another milestone in the practical application of nuclear power has now been reached with the awarding of a contract to Consolidated Vultee Aircraft Corp., San Diego, Calif., for an air frame to be powered by a nuclear reactor. Earlier this year, a contract for the power plant of such an aircraft was awarded the General Electric Co. The work is being done at G-E's Aircraft Gas Turbine Division, Lockland, Ohio. (Andrew Kalitinsky, chief engineer for the disbanded Nuclear Energy for Propulsion of Aircraft project at Oak Ridge, which did research studies on the theoretical aspects of the subject, and whose basic data is being utilized by G-E at Lockland, told a meeting of the Institute of Aeronautical Sciences last year that a turbo-jet nuclear apparatus might be the easiest of all applications of nuclear power to aircraft. This assumes interest in view of (1) G-E's approach, and (2) the fact that Consolidated are the builders of the new all-jet B-36, the largest jet aircraft flying in the world today.)

The experimental detonation of nuclear explosives (and ordinary high explosives) will be resumed at the USAEC's Nevada Test Site, near Las Vegas, Nev. Permanent construction is now at the point where this experimental work has become possible, according to Carroll L. Tyler, USAEC manager of Santa Fe Operations, the supervising office. Tyler observed that off-site radiation above normal levels had occurred in other parts of the U.S., as well as in Nevada, as a result of previous nuclear explosions here. He said the same thing could be expected from future nuclear explosions. Dr. Alvin C. Graves, of Los Alamos Scientific Laboratory, is Test Director at Nevada with a staff of USAEC people from Los Alamos and Sandia Laboratories. (Sandia is the center of nuclear weapon procurement and assembly.)

New discoveries of low-grade uranium minerals have now been made in Park and Lake counties, Colorado, near the well-known mining camp of Leadville. These finds, which are in the Alma and St. Kevin districts of central Colorado, were confirmed by the Interior Department, in Washington last week. In the Alma district, the Department stated, a piece of ore assaying more than 1% uranium was found on the dump of an abandoned mine. In the St. Kevin district, the uranium-bearing mineral torbernite was found at a small prospect. Other occurrences of uranium-bearing minerals, very low in grade, also have been found in the area. Although the finds themselves are not commercially valuable, they do point out a region where further search may be warranted. This is the first time uranium minerals have been found in the area.

Despite the 50% increase in the USAEC's operations, and a doubling or tripling of its construction as compared to last year, a rider on the USAEC's 1952 appropriation, as approved by Congress, will limit the Commission's salary expenditures to $25,135,000.00, a 10% cut over last year.

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PRODUCTS, PROCESSES & INSTRUMENTS...for nuclear work...

RADIOISOTOPES-After more than a year of research and field tests by Radioactive Products, Inc., Detroit, and Dowell, Inc., Tulsa, Okla., radioisotopes are now being successfully used to increase oil production by a new and simple method of controlling and evaluationg oil well acidizing. Mr. John R. Niles, of Radioactive Products (nuclear products firm), and Dr. John J. Grebe, of Dowell (Dow Chemical's oil well servicing organization) were responsible for this new development.

In the usual oil well acidizing treatment, acid is pumped into both new and old oil wells to dissolve out particles of limestone which clog the pores of permeable oil-bearing formations and prevent the flow of oil into the bore hole. The Dowell "selective acidizing" process directs the acid to the oil-bearing formation only, preventing any wasteful reaction of acid on rock or limestone containing no oil. A difficulty in the Dowell process however, was the necessity to remove the tubing from the oil well before the control instruments could be used. This involved hoisting and disjointing as much as 10,000-ft. of 2" pipe sections.

The new radioactive method eliminates this costly and hazardous operation. Instead, a Geiger counter, 6-ft. long and 1-in. in diameter, electrically connected to mobile measuring and indicating equipment brought to the well site, is lowered on a 12,000-ft. steel and copper cable to the point in the well to be acid-treated. Meanwhile, radioactive material has been added to the oil well treating acid---some thousands of gallons of it. This radioactive acid is then pumped down the 2-in. tubing which opens into the bottom of the well. By the extent of radioactivity, as measured by the submerged Geiger counter, and shown at the surface on the indicating and recording apparatus, it is possible to control the acid level in the well. After the acid has been flushed out, the Geiger counter is again used to measure the radioactivity of the formation at each level. This gives additional valuable information on where the acid went to produce the results obtained from this acidizing.

ATOMIC PATENT DIGEST...latest U.S. applications and grants...

An X-ray thickness gauge for measuring material thickness. Comprises a "standard" source of X-rays, and a "test" source of X-rays, light sensitive means responsive to the intensity of the X-ray beam impinging thereon from the "standard" source and the "test" source, and apparatus so operable as to cause a registration of the intensity of the X-rays from such sources as a measure of material thicknesses when interposed in these X-rays from such sources as a measure of material thicknesses when interposed in these X-ray beams. U. S. Pat. No. 2,565,734, issued Aug. 28, 1951; assigned to Westinghouse Electric Corp., E. Pittsburgh, Pa.

Process for the chlorination of heptane in liquid phase. Comprises reacting the heptane with elemental chlorine diluted with approximately an equal volume of hydrogen chloride under actinic light while maintaining a temperature between about 25-30 deg. C. for approximately 24-hours, and reacting the resultant partially chlorinated heptane with undiluted elemental chlorine under actinic light for a further period of about 180-hours at a temperature gradually increasing to about 129-deg. C. U. S. Pat. No. 2,556,052, issued Aug. 28, 1951; assigned to United States of America (USAEC).

Process for the aliphatic chlorination of an alkyl substitued mononuclear aryl hydrocarbon. Comprises reacting elemental chlorine with the said hydrocarbon under actinic light for at least several hours while maintaining an initial reaction temperature between about 25-120-deg. C., but below the temperature at which substantial decomposition of the said hydrocarbon occurs. This is followed by further chlorination of the resultant partially chlorinated hydrocarbon with elemental chlorine under actinic light. U. S. Pat. No. 2,566,065, issued Aug. 28, 1951; assigned to United States of America (USAEC).

Apparatus for determining the quantity of nuclear particle radiation. Includes: a series of secondary-emission charged-particle responsive means exposed to said radiation, a series of means progressively radially disposed with respect to said responsive means for multiplying and collecting said secondary particles, means for biasing said multiplying and collecting means in respect to said radiation responsive means, and means coupled to said collecting means and quantitively responsive to said collected particles, the extent of response of said last mentioned means being a measure of the quantity of radiation. U. S. Pat. No. 2,566,089, issued Aug. 28, 1951; assigned to Radio Corp. of America.

AT THE ATOMIC CITIES & CENTERS IN THE UNITED STATES...

HANFORD WORKS, Richland, Wash.-General Electric Company's contract with the USAEC for operation of the Hanford Works here has been extended for five years. (As part of the same contract, G-E will also continue with its operation of the Knolls Atomic Power Laboratory, near Schenectady, N. Y., for another five years.) The extended contract will run until June 30th, 1956. G-E has operated the Hanford plutonium plant for the government since September, 1946, when it took over from du Pont. All costs incurred by Genreral Electric in carrying out its contract are reimbursed from government funds; it receives only the legally-necessary $1.00 per year fee. (This contrasts with Union Carbide's operations at Oak Ridge, where, under a similar cost-reimbursement contract, Union Carbide demanded, and gets, a substantial yearly operating fee.) However, the new Hanford contract extension does provide for a possible future renegotiation of the yearly fee. While the original G-E ---USAEC contract had called for provisional advancement by the government to the company of $200,000 per month for administrative costs, the new contract extension has reduced this to $100,000 per month. Both the old and the new contracts of course provide for refunding to the government unexpended funds. To date, the total of all refunds being made by G-E (both for this monthly advance, and other reserve funds) will amount to approximately $10 million.

One provision of the new contract extension provides that the USAEC accept assignment of existing construction contracts at Hanford Works and at Knolls Laboratory, and that the USAEC award future contracts direct for construction projects. Prior to this, G-E had selected construction contractors. However, G-E will continue to furnish architect-engineer-management and other related construction services, such as preliminary studies and surveys, procurement, design and construction, supervision, and warehousing. G-E will continue to manage Richland, the "company-town" being supported by Hanford Works.

OAK RIDGE, Tennessee- Nuclear fuel for power generation--literally a "salvage operation" of atomic war material--was recently described by Dr. C.G. Suits, G-E research director, at the symposium conducted here by the American Society for Engineering Education. The plutonium now being produced at a total cost of billions of dollars has only two known uses--bombs and the production of electric power, he stated. When the world finally reaches a real state of peace, this enormous expenditure should not be discarded, but rather be utilized for productive purposes. Dr. Suits described the three stages through which the production of plutonium has gone. The first occurred during World War II, when the objective was to produce plutonium without regard to cost. Up to the present, the post-war effort has been to produce it as economically as possible, in plants of war-time design, and this constituted stage two. By applying industrial production methods, the cost has been cut in half since 1945, he said, but to reduce it still more, it will be necessary to utilize the heat energy now wasted. With this in mind, several industrial groups, as well as laboratories operated by the USAEC, are now examining the question of efficient atomic power production. Thus, the third stage, which we are now approaching, he said, will be the production of both power and plutonium in specially-designed plants. The final solution seems to lie in the so-called power-breeder reactor, said Dr. Suits. Such a unit would supply heat that would be used to make steam, or some other vapor, which would then drive a turbine-generator, producing electric power. The reactor would also accomplish a continuous conversion of material, such as uranium-238 which makes up the major portion of natural uranium, into a fissionable material such as plutonium. This could then be used to produce additional power.

Our supplies of uranium would thus be stretched mightily, without in any way interfering with the production of useful heat energy, Dr. Suits explained. The high-temperature power-breeder reactor, which would utitlize substantially all the heat and all the fuel, must be regarded as the logical objective and challenge of the atomic industry in the years immediately ahead. Dr. Suits estimated that the cost of building such a reactor, to produce power at the rate of a million KW, might be from $50 to $100 million. He said this seems to be in the general range that would be economically feasible.

IONIZING RADIATION...investigations & notes...

No prolonged loss of fertility or incidence of abnormal offspring has resulted from atomic bomb attacks on Japan during World War II, according to a report to the Council on National Emergency Medical Service of the American Medical Association. One of the questions which arose after the bombing was its possible effect on the fertility and future children of the victims. The results were made known in a joint report by Drs. C. L. Dunham, E. P. Cronkite, G. V. LeRoy, and Shields Warren. (Dr. Cronkite is attached to the U. S. Naval Medical Research Institute, Bethesda, Md.; the others are connected with the USAEC, Washington, D. C.) "While it is too early to write of the eventual outcome of the Japanese who recovered from radiation injury," the report said," there is enough information available now to warrant the statement that the survivors have regained their fertility and that among the progeny of the survivors at Hiroshima and Nagasaki, no unusual incidence of abnormal offspring has occurred." However, the report disclosed that radiation cataracts of varying severity have occurred in appreciable numbers of those close enough to receive significant amounts of radiation, and that the incidence of leukemia will be higher among the survivors than in the Japanese population as a whole. "Treatment of radiation injuries, from the very beginning, should be directed at minimizing the effects of the tendency to hemorrhage and inability to combat infection," the report stated. "The value of antibiotics has been substantiated by a number of experimenters." According to the report, approximately one-half of the initial nuclear radiation is delivered in the first second after an atomic explosion, and 98% by the end of one minute. Those unshielded by buildings or natural objects will constitute the most exposed groups; those shielded by brick, concrete, or metal buildings will be less exposed; and those in tunnels, caves, or air raid shelters will be the least exposed. The shielding of some portion of the body, such as the head or the abdomen, may reduce the mortality. The data of the Japanese casualties have shown that in cases with very severe untreated radiation injuries, death is invariable and may occur from a few hours up to 14 days after exposure, the report declared. In severe radiation injury cases, the mortality varies from 25 to more than 50%. In mild to moderately severe radiation injury cases, recovery of better than 90% can be expected. In the latter group, the deaths that occur are generally the result of such complications as tuberculosis and anemia.

ATOMIC ENERGY WORK ABROAD...

NORWAY-Following the many months of research and planning which the project entailed, the uranium reactor, which Norwegian scientists and engineers have built at Kjeller, near Oslo, came into operation this past July 30th. Norway, Britain and France are the only countries in Western Europe possessing uranium reactors, and when the Kjeller reactor starts regular production of isotopes at the end of this year, it is hoped to supply the other Scandinavian countries and Holland and Belgium. The Norwegian reactor, claimed to be the cheapest so far built, cost under $2.5 million, including the heavy water and uranium. Attached to the reactor is a staff of 50.

GREAT BRITAIN- Controller of Atomic Energy in Britain is now L/Gen. Sir Frederick Morgan, 57 year old professional soldier. Sir Frederick was the original planner of the 1944 allied invasion of France, and had later been chief of operations of UNRRA in Germany. He succeeds Viscount Portal of Hungerford, who has resigned.

BOOKS & OTHER PUBLICATIONS...in the nuclear field...

Preparation, Properties, and Technology of Fluorine and Organic Fluoro Compounds. Edited by Dr. Charles Slesser, USAEC, New York. Comprises 40 chapters dealing with Government-sponsored research during World War II in connection with the atomic project. The volume is the 18th in the national nuclear energy series. Scientific people of four of the industrial organizations and four of the academic organizations which conducted major projects in this field contributed the 40 papers. 892 pages.--McGraw-Hill Book Co., New York.

Sincerely,

The Staff
ATOMIC ENERGY NEWSLETTER